

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1-19 are pending in this application. New dependent claims 11-19 are herein added. Applicants submits the claims are clear from the original disclosure, and thus do not add any new matter.

Claims 1, 4, 5, and 7 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. patent 5,899,857 to Wilk. Claims 8 and 10 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. patent 5,304,113 to Sieber et al. (herein “Sieber”). Claim 2 was rejected under 35 U.S.C. § 103(a) as unpatentable over Wilk. Claims 3, 6, and 9 were objected to as dependent upon a rejected base claim, but were noted as allowable if rewritten in independent form to include all of the limitations of their base claim and any intervening claims.

Initially, applicants gratefully acknowledge the early indication of the allowable subject matter in dependent claims 3, 6, and 9. By the present response each of claims 3, 6, and 9 is amended to be rewritten in independent form, and thus each of amended claims 3, 6 and 9 is now believed to be allowable.

Applicants also note one of the outstanding rejections noted above cites U.S. patent 5,304,113 to Sieber against claims 8 and 10. Applicants point out at this time Sieber has not been officially made of record as Sieber has not been cited on a Form PTO-892. Applicants respectfully request that Sieber be formally made of record and be cited on such a Form PTO-892.

Addressing now the rejection of claims 1, 4, 5, and 7 under 35 U.S.C. § 102(b) as anticipated by Wilk, and the further rejection of dependent claim 2 under 35 U.S.C. § 103(a) as unpatentable over Wilk, those rejections are traversed by the present response as now discussed.

Independent claim 1 is herein amended to clarify certain features therein.

Independent claim 1 is directed to an electromagnetic wave irradiation tool that includes a narrow tube that can irradiate an electromagnetic wave of “a terahertz band”, as now clarified in independent claim 1. That subject matter is believed to be clear from the original specification, see for example equations (2)-(5) in the specification at pages 23-24 and the corresponding discussion thereto, although that subject matter is noted throughout the specification.

Independent claim 1 also clarifies the electromagnetic wave of the terahertz band has a frequency equal to a characteristic frequency of a “cell of a biological body … so as to excite the cell by the electromagnetic wave emitted from the electromagnetic wave irradiation terminal”. That subject matter is discussed throughout the present specification, see for example page 17, line 19 et seq.

Independent Claim 5 is similarly amended as in independent claim 1 to recite the generated electromagnetic wave is “of terahertz band” and has a frequency equal to a characteristic frequency of a “cell of a biological body so as to excite the cell by the electromagnetic wave emitted from the antenna”.

The above-noted features clarified in each of amended independent claims 1 and 5 are believed to clearly distinguish over Wilk.

Wilk discloses a medical treatment method with a scanner input in which frequency generators 14 and 16 generate essentially monochromatic electromagnetic energy having one or more distinct frequencies in the microwave, near millimeter, infrared, optical, or ultraviolet regions of the electromagnetic spectrum (see Wilk at column 4, lines 45-51 and column 9, lines 1-6).

In contrast to the above-noted disclosure in Wilk, each of amended independent claims 1 and 5 recites generating an electromagnetic wave of the terahertz band. As noted in

the present specification for example at equations (2)-(5) on pages 23-24, by utilizing an electromagnetic wave of the terahertz band a penetration depth can be approximately 70 μm for a frequency of 3 THz, and a penetration depth can be approximately 115 μm for a frequency of 1.2 THz. Wilk does not disclose or suggest generating such a terahertz band signal, and that may result as Wilk is not directed to the same type of device as claimed.

Wilk pertains to a non-invasive medical treatment system in which a waveguide 18 or casing 56 is not designed to enter a body by puncture or incision. As Wilk is directed to such as non-invasive medical treatment, Wilk requires generating a microwave or near millimeter wave that has a high penetration depth.

In contrast to Wilk, in the claimed invention the electromagnetic wave is in the terahertz band as a high penetration depth is not needed as in Wilk, and that results as the claimed invention is directed to an electromagnetic wave irradiation device with a narrow tube. The claimed invention utilizes such a narrow tube as the tube must enter into a body by puncture or incision, such as implemented by an endoscope probe, a laparoscope employed in operations such as an extirpation surgery of gallbladder, a needle-shape appliance employed in surgical operations of prostatic cancer, or a catheter configured to be inserted into a blood vessel or a body cavity, as non-limiting examples. Wilk is not directed to such types of devices.

Moreover, Wilk does not disclose or suggest that the generated electromagnetic wave has a characteristic frequency of a cell of a biological body so as to excite the cell by the electromagnetic wave emitted from the electromagnetic wave irradiation terminal of the narrow tube.

In view of the foregoing comments, applicants respectfully submit each of amended independent claims 1 and 5, and thereby the claims dependent therefrom, patentably distinguish over Wilk.

Addressing now the rejection of claims 8 and 10 under 35 U.S.C. § 102(b) as anticipated by Sieber, that rejection is also traversed by the present response.

Independent claim 8 is similarly amended as in independent claim 1 to recite that the generated electromagnetic wave is in the terahertz band, and also recites the generated electromagnetic wave has a frequency equal to a characteristic frequency of a cell of a biological body existing in a blood-draw line so as to excite the cell by the electromagnetic wave.

Applicants submit such features are neither taught nor suggested by Sieber.

Sieber discloses a method of eradicating infectious biological contaminants in a body tissue such as blood by utilizing an irradiation station 17 including an irradiation chamber 19 and irradiation source 20. Sieber discloses a product to be treated is subject to visible light having a wavelength range upwards of about 400 nm to about 1000 nm and is preferably visible light having the bulk of its spectral components in the preferred orange to green range for activation of a particular photosensitive agent employed in the treatment being conducted (Sieber at column 4, line 60 to column 5, line 1).

Such disclosures in Sieber do not correspond to the independent claim 8 features of irradiating an electromagnetic wave of the terahertz band that has a frequency equal to a characteristic frequency of a cell of a biological body to excite the cell by the electromagnetic wave.

Thereby, applicants respectfully submit independent claim 8, and claim 10 dependent therefrom, patentably distinguish over Sieber.

Applicants also note the present response adds new dependent claims 11-19 for examination, which recite further specific features of the electromagnetic wave generation unit and cell, which are believed to even further distinguish over the applied art.

In view of the present response applicants respectfully submit the claims as currently written are allowable over the applied art.

As no other issues are pending in this application, it is respectfully submitted that the present application is now in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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